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Mississippi Valley. The insect occurs, however, very generally over the country east of the Mississippi river, even into Canada; and there are strong indications that it produces similarly injurious effects elsewhere. To give a single example:—according to the records, most of the vineyards on Staten Island which were flourishing in 1861, and which were composed principally of Catawba, had failed in 1866, and Mr. G. E. Meissner, of Bushberg, who then owned a vineyard on that island, informs me that he had noticed the nodosities, and that the roots of the dying vines had wasted away.* I cannot conclude without publicly expressing my indebtedness to Messrs. Lichtenstein and Planchon, of Montpellier, France, for the cordial and generous manner in which they gave me every facility for studying the insect there, and witnessing experiments in the field.

REVIEWS AND BOOK NOTICES.

Recent Discoveries in Ornithotomy.—The authors' courtesy places two very notable papers on our table. I. Prof. Morse's embryological studies † have furnished one of the most important contributions ever offered in this country to our knowledge of the structure and development of birds. His entirely original researches, conducted with scrupulous care, in the most candid spirit, not only confirm the late determinations of Gegenbaur and other European anatomists, but take a long step beyond. We have from time to time been apprised of the author's progress in the investigation, and since its close have given the subject the closest scrutiny. In stating the points we believe that the author has established, we must also indicate those that we hold to be still questionable.

Prof. Morse finds four tarsal bones. Three of these have been very generally recognized of late, although rejected or at most not fully accepted, by such an eminent authority, for instance, as Owen, whom the author very properly arraigns for his unphilosophic handling of the carpal-tarsal homologies. They are two near bones, anchylosing together, and with the tibia, serving to form the characteristic avian bitrochlear malleoli; and one far bone which unites with the metatarsals. For these Prof. Morse accepts the determinations implied in Gegenbaur's nomenclature, calling them *tibiale*, *fibulare* and *centrale* (astragalus, calcaneum and naviculare). Many interesting details of the form, time and mode of fusion, etc., in different species are given. The fourth bone is a "new" one, the recognition of which as an integral element of the avian tarsus we owe to Prof. Morse. Authors have described a so-called "process of the astragalus" in certain birds, and it has been stated that the astragalus of higher vertebrates represents the tibiale and the intermedium (of reptiles), connate; but it remained for Prof. Morse to determine that a certain "pre-tibial" bone of a species of heron, noted in Prof. Wyman's manuscript, now published, as finally uniting the astragalus to form a "process" identical with that described by Huxley, is a distinct tarsal element which, for anything appearing to the contrary, must be identified with the reptilian *intermedium*. We consider this view entirely reasonable—in fact, we know of no other warrantable conclusion from our present data, and we are thus prepared to adopt all of Prof. Morse's views respecting the composition of the avian tarsus, without reserve or qualification.

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* Since the above was written, I have listened to an essay on Grapes, by Mr. P. Manny, of Freeport, Stephenson county, Illinois. In this essay, which was read before the Illinois State Horticultural Society, the writer states that his Delaware, Iowa and Salem vines lose their lower roots. He attributes this loss of roots to the tenacity of the soil (though more likely owing to unseen root-lice) and has remedied it in a measure by grafting on Clinton roots.

† *On the Carpus and Tarsus of Birds.* By Edward S. Morse, Ph.D. Ann. Lyc. Nat. Hist., N. Y., X, 1872.

If we must think that he has not been equally successful in determining the structure of the carpus, we are at least prepared to show cause for our lacking faith in some of his conclusions. Respecting this segment the author writes: "In the fore limb or wing there are at least four carpal bones, two in the proximal series, and two in the distal series. *When more than four carpals occur, as in the*" etc. The two of the near series are those that persist free in the adult carpus, well known as "scaphoid" (or "scapholunar") and "cuneiform," or, in better nomenclature, *radiale* and *ulnare*. The two far bones come of Prof. Morse's resolution of the so-called "epiphysis of the metacarpal into two carpal elements, one capping the mid-metacarpal, the other the annularis. Since the metacarpals of higher vertebrates, excepting that of the pollex, are well known to lack a proximal epiphysis, the part in question was early determined to belong to the carpus, though it has been generally recognized as only a single bone. Prof. Morse's figures show plainly that there are always *two* ossific centres, and that the ossicles are often as distinct from each other as are the metacarpals they respectively cap. This important point may be considered as established. The author is uncertain of the homologies of these two far bones, querying whether that one capping the mid-metacarpal be intermedium and centrale connate, or *carpale iii* ("magnum"); but he provisionally holds it as *carpale iii*, and the other as *carpale iv*, as marked in all his figures.

The sentence we have italicized above will be met with surprise if not with suspicion, and we cannot believe, upon the data furnished, that more than four carpals occur. Indeed, the author himself explicitly records his uncertainty respecting the "extra" carpals mentioned as *apparently* present in Tyrannus and Dendrœca. The piece marked "*c*" in figure 47 (Tyrannus) is doubtless "the result of accidental pressure" which separated it from *carpale iii*, while that marked "2" in figure 48 (same bird) seems unquestionably pressed apart from *radiale;* in each case we would emphasize the author's words: "it is safe to reject its occurrence for the present." In the case of Dendrœca, we think that the difficulty of the supposed extra carpal can be satisfactorily explained. Prof. Morse has been led to believe that "the *ulnare* may unite with the ulna," because he several times observed a close mutual appression of the two bones, and failed to find an *ulnare* at all in two instances. But in figure 43, where no ulnare is represented, we are satisfied that the missing bone simply escaped the field of the microscope; while in figure 44, the bone marked "*i*" and supposed to be an additional carpal on the radial side is, in our judgment, the ulnare itself accidentally displaced to the right. In this last figure, it will be observed, the author queries the ulnare as having anchylosed with the ulna; but unless we are altogether misinformed, no such anchylosis ever occurs. In all birds, so far as we know, the ulnare persists free, and gives an insertion to the *flexor metacarpi ulnaris* (just as is incidentally shown in fig. 34). Accounting as above for the respective disagreements of figures 43, 44, 47 and 48 with the others, all the figures show clearly the four carpal bones that the author may justly claim to have established.

Respecting the carpal-tarsal homologies, of which the author does not specially treat, we should say that, while the antitypy of *tibiale* and *ulnare* and of *fibulare* and *radiale* appears unquestionable, observations are wanted to show the relations of the remaining tarsal bones with those of the distal carpal series; for if Prof. Morse correctly identifies the latter as *carpale iii* and *iv*, these do not correspond with those of the tarsus determined as *intermedium* and *centrale*.

This remarkably able paper is illustrated with two colored plates containing forty-eight figures from the author's accomplished pencil, representing exactly what he saw. We trust that Prof. Morse will continue his admirable embryological studies, and show us more new things. Ornithology has plentiful need of workers of his stamp.

II. Although we only undertake to give a complete record of *American* papers relating to ornithology, we shall have frequent occasion to notice foreign publications of general interest or special importance. Prof. Reinhardt* makes an important announcement respecting "l'os crochu" (*os uncinatum*) observed by Magnus in Phœnicophæus, and which, he states, is the same as the *ossiculum lacrymo-palatinum* described by Brandt in Tachypetes and various *Procellariidæ.* He further states that this bone is highly characteristic of the *Musophagidæ*, having found it in all the genera and nearly half the species of Turacous. He describes its peculiarities in detail. Among the Cuculidæ, besides Phœnicophæus, he has seen it in Zanclostomus, Rhinortha and Eudynamys, whilst it is wanting in Centropus and several American forms. In the *Trogonidæ*, a species has the uncinate bone "represented by a slender falciform apophysis of the descending ramus of the lachrymal, bending towards the palate." Tachypetes remains the only totipalmate bird in which the ossicle is known to occur — which is interesting, seeing that the frigate alone of *Steganopodes* is petrel-like in superficial aspects. The bone appears to be as characteristic of the *Procellariidæ* as of the Turacous, occurring in nearly all of the genera of that family, though among the " stormy petrels " (Thalassidroma Auct.) it is merely represented by a ligament; but what, if any, relationship it may indicate does not appear. Prof. Reinhardt agrees with Brandt that the function of the bone relates rather to the olfactory than to the visual apparatus.

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* *Om en hidtil ukjendt Knogle i Hovedskallen hos Turakoerne* (Musophagides), etc. Af J. Reinhardt. Vidensk. Meddel. f. d. Naturh. Foren. Kjöbenhavn. 1871.

The author takes the opportunity of correcting Huxley's hasty generalization respecting the absence of basipterygoids in *Procellariidæ* – an error which, however, had been already exposed.* Although these processes are absent in Diomedea and rudimentary in "Thalassidroma," they are well developed in other genera; and the fact is, that basipterygoids are highly characteristic of the *Procellariidæ.* — ELLIOTT COUES.

GUIDE TO THE STUDY OF INSECTS.†— A third and revised edition of this work has appeared with a few changes and additions of considerable importance. The author calls attention to the change in his views as to the number of segments in the head of six-footed insects; there being four instead of seven. A brief account of the recent discovery of Parthenogenesis in the pupa of a Chironomus is given; and also of wax-secreting glands lately found in wax-producing insects, *i. e.*, the bees, aphides and bark lice (*Coccidæ*). Moreover a correct figure of the caterpillar and chrysalis of *Melitæa Harrisii*, takes the place of the incorrect representation in the first two editions, while a short notice of the worm-like mites, *Linguatulina*, is inserted.

The Appendix consists of illustrated notices of the early stages of certain ichneumon parasites; of the embryonal membranes of insects; of the development of the louse: the mode of formation of the wings of insects; of Paolia, a remarkable fossil carboniferous insect and of abdominal sense organs of certain insects, while sketches of Schiödte's new classification of the Hemiptera, and Thorell's arrangement of the spiders are presented. Two plates are added, illustrating injurious and beneficial insects. Two other steel plates, one of lice, the other of Thysanura are added, and several new species of insects referred to.

THE DESMIDS.‡ Microscopists will welcome this beautiful memoir on the desmids of Sweden. It will be invaluable to American observers, as there is so much similarity between the

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* By T. HALE STREETS. Proc. Phila. Acad., 1870, 85.

† Guide to the Study of Insects, and a Treatise on those injurious and beneficial to Crops: for the use of Colleges, Farm-Schools, and Agriculturists. By A. S. Packard, Jr., M.D. With 15 plates and 670 woodcuts. Third edition. Salem, 1872. 8vo. pp. 715. Price reduced to $5.00.

‡ De Desmidiaceis, quæ in Suecia inventæ sunt. Observationes criticæ. Auctore P. M. Lundell. Cum tabulis V, pp. 100. Nova Acta of the Royal Society of Sciences of Upsala, 4to, 1871.